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A

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A

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A

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A

(24)

precursor

.(24)

120

(30)

A

(29)

/

4000

(4)

A

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\* البحث مستل من رسالة ماجستير للباحث الاول

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(28) 30-10  
Biological accumulation

A 500000 A  
. (8) 100

A A (13 14)  
(18) 1 %64 β-carotene  
500  
12,000  
. (27)

A  
10000  
(1)

(3)  
25000 A  
20000 (13)

(19) (23)

. (31) A  
A



Ross

75

:

.(4)

:A

Vitamin A acetate

/

.

:

A

20000

/

20000

A

(4)

0.344

:

x

= 0.344 x 10<sup>6</sup> x

x

x

. A

=

0.344

1 =

10<sup>6</sup>

:

:

A

:A0



.	A	20000	:A1
	A	40000	:A2
	A	60000	:A3
	A	100000	:A5

B,C,D,E,K

.(4)

:

:

7-3

%10

%10

:

%10

12 : (20) Luna  
%10

125

50

125

250



probe

12

10

%10

0.65

Na<sub>2</sub>HPO<sub>4</sub>

0.45

.

100

NaH<sub>2</sub>PO<sub>4</sub>



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:

A5

A3

A5

A3

A5

(2)

A2

A0 A

(3)

A3

A2

A0 A1

A0

		(6;16)		A
A2	A3		A5	
		.(1)	Osteoperosis	
			A3 A5	
		‘A2	A3	A5
			(A5,A3)	
			subcutaneous	
(3)				(4)
			. hydrocephalous	
		A1,A2		
.(26) Melhus		A2	A3	A5
			:	
		A		Hough
(15)			Bone resorption	
	(10)			(A0)
( )		mononuclear cells		
			(A1)	
			degeneration	
				epiphesis
mononuclear cells			portal area	
			macrophage	
			hyperplasia	



Fibrocytes

(A2)

Osteoporosis

Bone marrow

(7)

.( )

A1

Cellular Degeneration

Glomeruli

Hyperkeratosis

Dermis

(A3)

Cortical Bone

(11)

.Hyperchondrosis

(A5)

(9) Hyperchondrosis

(10)

Cortical Bone

Osteoid Tissue

(5)



Macrophage

(7)

(13)

(8)

(6)

.(12)

(7) Edwards Ballard

A

.(10 36 12 16 37)

A

D

A

D

A

A

(10)

D

.(17)

A

Osteoclasts

Osteoblast

Bone

Bone resorption

A  
formation

(36 33)

.(39 37)

Marrow Stromal Cells (MSCs)

A



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Multipotential

A

(32)

Thrombocytopenia

A

A

(34)

Lysosomal hydrolases

A

(9)

(35)

Retinol Binding Protein RBP  
Lipoprotein

.(22)

A3 A5

(16)

Jensen

A

.(11 29)

A

A



( )



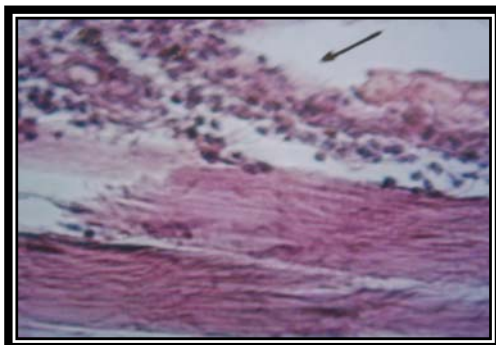
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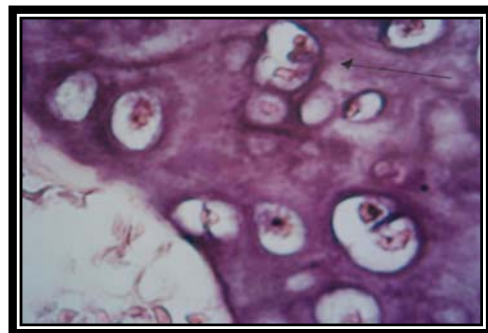
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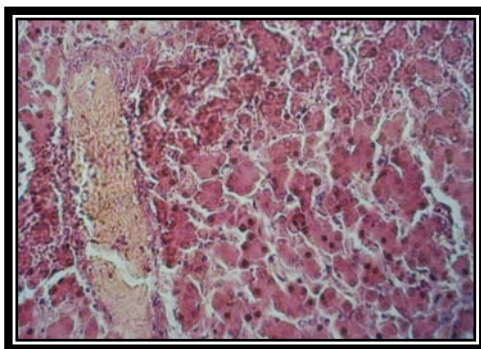
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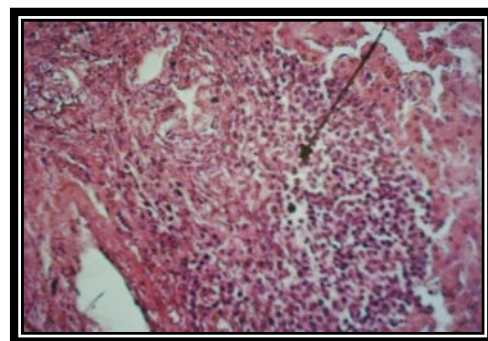
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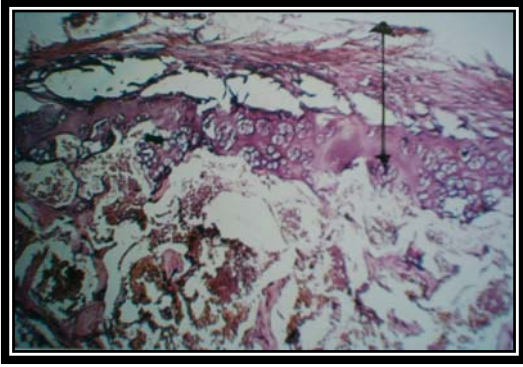
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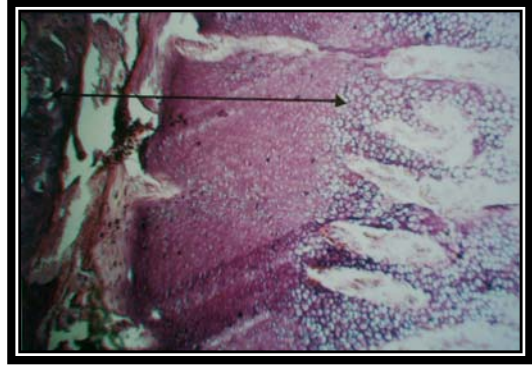
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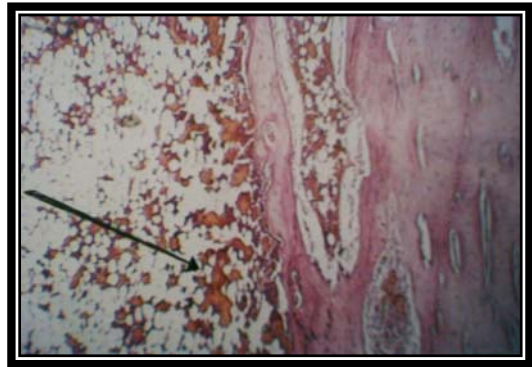
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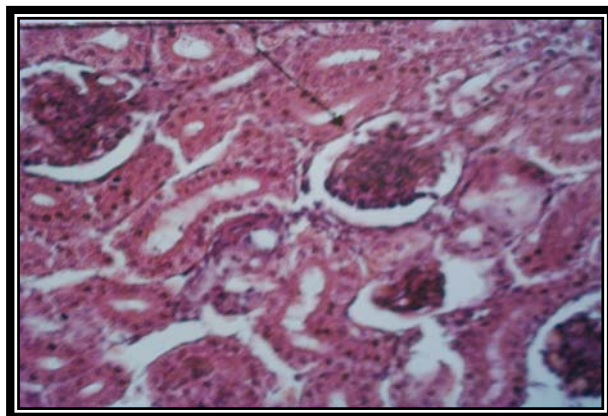
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- A . ( ) .
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5. Allen, L. H.; Haskell, M. (2002). Estimating the Potential for vitamin A toxicity in women and young children. *J. Nutr.* 132: 29075 – 29195.
  6. Baker, J. R.; Howell, J. M. and Thompson, J. N. (1967). Hypervitaminosis A in the chick. *Br. J. Exp. Pathol.* 48: 507-512.
  7. Ballerd, R.; Edwards, J. R. (1988). Effect of dietary zeolite and vitamin A on tibial dyschondroplasia in chicken. *Poultry Science.* 67:1
  8. Bendich, H. and Langseth, L. (1989) Safety of vitamin A. *Am.J.Clin.Nutr.*49: 358-371.
  9. Bowman, W. C. and Jrand, M. (1990). *Text Book of Pharmacology.* 2<sup>nd</sup> ed.
  10. Britton, G. (1995). Structure and properties of carotenoids in relation to function. *FASEB J.* 9:1551-1558.
  11. Eledrisi, M. S. (2003). Vitamin A toxicity. King Abdulaziz National Guard Medical Center, Saudia Arabia. E: <http://www.emedicine.com> .
  12. Forsyth, S.; Watson, R. R.; Gensler, H. L.; (1989). Osteotoxicity after chronic dietary administration of 13-cis- retinoic acid, retinyl palmitate or selenium in mice exposed to tumor initiation and promotion. 45: 2149-2156.
  13. Hathcock, J. N.; Hattan, D.G.; Jenkins, M. Y.; McDonald, J.T.; Sundaresan, P. R. and Wilkening, V. L. (1990). Evaluation of vitamin A toxicity. *Am. J. Clin. Nutr.* 52: 183-202.
  14. Herbert, V. (1982) .Toxicity of 25,000 IU vitamin A supplements in “health” food users. *Am. J. Clin. Nut.* 36(1): 185-186.
  15. Hough, S.; Avioli, L. A.; Muir, H.; Gelderblom, D.; Jenkins, G.; Kurasi, H.; Slatopolsky, E.; Bergfeld, M. A. and Teitelbaum, S. L. (1988). Effect of hypervitaminosis A on the bone and mineral metabolism of the rat. *Endocrinology.* 122: 2933-29.
  16. Jensen, L. S.; Fletcher, D. L.; Liburn, M. S. and Akiba, Y. (1983) Growth depression in broiler chicks fed high vitamin A levels. *Nutr. Rep. Int.* 28: 171 – 179.

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- 
17. Johansson, S.; Melhus, H. (2001). Vitamin A antagonizes calcium response to vitamin D in man. *J. Bone. Miner. Res.* 16: 1899-1905.
  18. King, A. J.; Uijttenboogaart, T. G.; Vries, A. W. (1995). The alphanatocopherol, beta-carotene and ascorbic acid as antioxidant in stored poultry muscles. *Journal of food science.* 60: 1009-1012.
  19. Leo, M. A.; Lieber, C. S. (1999). Alcohol, vitamin A and B-carotene: Adverse interactions, including hepatotoxicity and carcinogenicity. *Am. J. Clin. Nutr.* 69: 1071– 1084.
  20. Luna, L. G. (1968). *Manual of Histological Staining Methods of Armed Forces.* Ins. Of pathology. 3rd ed. Megraw – hill book co. New York.
  21. Mahalanabis, D.; Rahman, M. M.; Wahed, M. A.; Islam, M. A.; Habte, D. (1997). Vitamin A megadoses during early infancy on serum retinol effects 6 month follow-up. *Nut. Res.* 17 (4): 649-659.
  22. Mahoney, C.; Margolis, M.; Knauss, T. and Labbe, R. (1980). Chronic vitamin A intoxication in infants fed chicken liver. *Pediatrics.* 65:893- 897.
  23. Mallia, A. K.; Smith, J. E.; Goodman, D. S. (1975). Metabolism of retinol – binding protein and vitamin A during hyper vitaminosis in the rat. *J. Lipid. Res.* 16:180-188.
  24. Marcus, R. and Coulston, A. M. (2001). Fat soluble vitamins. In: *Pharmacological Basis of Therapeutics.* Gillman and Goodman. 2: 1553-1570.
  25. McLaren, D. S. (1993). Vitamin A. In: *Hemavit Nutrition and Dietetics.* 19th ed. (eds. Garrow J.S.WPT). Churchill Living stone. Edinburgh. p: 208-21.
  26. Melhus, H.; Michaelsson, K.; Kind, M. A.; Bergstrom, R.; Holmberg, L.; Makmin, H. and Wolk, A. (1998). Excessive dietary intake of vitamin A is associated with reduced bone density and increased risk for hip fracture. *Ann. Int. Med.* Nov.15:129(10):770-778
  27. National Research Council. (1996). *Recommended Dietary Allowances,* 10<sup>th</sup> ed. National Academy Press, Washington, DC.
  28. *Nutrient Requirements of poultry.* (1994). 9<sup>th</sup> revised edition .National Academy Press .Washington, D. C.S .
  29. Teratology Society. (1987) Teratology Society paper: recommendations for vitamin A use during pregnancy .*Teratology.*35:267-268.
  30. Olson, J. A. (1990). Vitamin A carotenoids and retinoids in health maintenance. *Nutrition and the M.D.* 16 (4):1-3.
  31. Olson, J. A. (1993) Vitamin A. Present knowledge in nutrition. The nutrition foundation, Washington D. C.: 176-191.
  32. Perrotta, S.; Nobili, B.; Rossi, F.; Criscuolo, M.; Iolascon, A.; Daniela, D.; Passaro, I.; Cennamo, L.; Oliva, A. and Regione, F. D. (2002). Infant hypervitaminosis A causes severe anemia and thrombocytopenia.

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33. Rhode, C. M.; Manatt, M.; Claget- Dame, M.; Deluca, H. F. (1999). Vitamin A antagonizes the action of vitamin D in rats. *J. Nut.* 129: 2246-2250.
  34. Russel, R.; Boyer, J. L.; Bagheri, S. A. (1974). Hepatic injury from chronic hypervitaminosis A resulting in portal hypertension and ascites *N. Engl. J. Med.* 291: 435-440.
  35. Smith, J. E.; Muto, Y.; Hileh, P. O. and Goodman, D. S. (1973). The effect of chylomicrone vitamin A on the metabolism of retinol binding protein in the rat. *J. Biol. Chem.* 248: 1544-1549.
  36. Togari, A.; Kondo, M.; Arai, M. Matsumoto, S. (1991). Effects of retinoic acid on bone formation and resorption in cultured mouse calvaria. *Gen Pharmacol.* 22: 287-292.
  37. Veltman, J. R.; Jensen, L. S. and Rowland, G. N. (1985). Interaction between high dietary vitamin A and low dietary Vitamin D in the chick and turkey, *Poult. Nut. Rep. Int.* 31:299-308.
  38. West, C. E.; Eilander, A. and Van Lieshout, M. (2002). Consequences of revised estimates of carotenoid bioefficacy for dietary control of vitamin A deficiency in developing countries. *J. Nut. Suppl.* 132: 2902S-2906S.
  39. Wolbach, S. and Hegested, D. (1952). Hypervitaminosis A and the skeleton of growing chicks. *Arch. Pathol.* 54:30-38.
  40. McLaren, D.; Frigg, M. (2001). *Sight and Life Manual on Vit. A Deficiency Disorders*, 2nd ed. <http://www.sightandlife.org>.
  41. [www. Health ato z.com](http://www.healthatoz.com). Vitamins toxicity, vitamin A toxicity. 2005.

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## **Toxic Effect of Vitamin A in Growing Broilers**

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### **Abstract**

**This study was performed to evaluate the toxic effect of hyper vitaminosis A on the biological and metabolic parameters of broiler young chicken. The results of the present study indicated an adverse effect of hypervitaminosis A on the growing broiler. Clinical signs represented by skeletal abnormalities, swelling of the knee joint, lameness, increased bone fragility, ascitis, edema, macro and micro lesions of the examined organs(especially liver, kidney and bone). Bone fragility test showed increase in long bone thickness and increased fragility positively according to dose. The toxic effect of vitamin A on bone marrow was obvious as the histopathological exam appeared replacement of red marrow with fatty tissue. Histopathological exam revealed lesions in the examined tissues (such as liver, kidney, bone, bone marrow) varies in severity that increased according to increase of the dose.**

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**\* Part of M.Sc. thesis for the first author**